16/05/2002 10/023,163

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SYSTEM:OS - DIALOG OneSearch
  File 155:MEDLINE(R) 1966-2002/May W2
*File 155: This file has been reloaded. Accession numbers have changed.
  File   2:INSPEC 1969-2002/May W2
         (c) 2002 Institution of Electrical Engineers
  File   5:Biosis Previews(R) 1969-2002/May W2
         (c) 2002 BIOSIS
  File   6:NTIS 1964-2002/May W4
         (c) 2002 NTIS, Intl Cpyrght All Rights Res
*File   6: See HELP CODES6 for a short list of the Subject Heading Codes
(SC=, SH=) used in NTIS.
  File   8:Ei Compendex(R) 1970-2002/May W2
         (c) 2002 Engineering Info. Inc.
  File  73:EMBASE 1974-2002/May W2
         (c) 2002 Elsevier Science B.V.
*File  73: For information about Explode feature please
see Help News73.
  File  94:JICST-EPlus 1985-2002/Mar W4
         (c)2002 Japan Science and Tech Corp(JST)
*File  94: There is no data missing. UDs have been adjusted to reflect
 the current months data. See Help News94 for details.
  File  35:Dissertation Abs Online 1861-2002/Apr
         (c) 2002 ProQuest Info&Learning
  File 144:Pascal 1973-2002/May W2
         (c) 2002 INIST/CNRS
  File 238:Abs. in New Tech & Eng. 1981-2002/May
         (c) 2002 Reed-Elsevier (UK) Ltd.
  File 105:AESIS 1851-2001/Jul
         (c) 2001 Australian Mineral Foundation Inc
*File 105: This file is closed (no updates)
  File  99:Wilson Appl. Sci & Tech Abs 1983-2002/Apr
         (c) 2002 The HW Wilson Co.
  File  58:GeoArchive 1974-2002/Mar
         (c) 2002 Geosystems
  File  34:SciSearch(R) Cited Ref Sci 1990-2002/May W3
         (c) 2002 Inst for Sci Info
  File 434:SciSearch(R) Cited Ref Sci 1974-1989/Dec
         (c) 1998 Inst for Sci Info
  File 292:GEOBASE(TM) 1980-2002/May
         (c) 2002 Elsevier Science Ltd.
  File  89:GeoRef 1785-2002/May B1
         (c) 2002 American Geological Institute
*File  89: Truncate SH codes for a complete retrieval.
  File  65:Inside Conferences 1993-2002/May W2
         (c) 2002 BLDSC all rts. reserv.
  File  77:Conference Papers Index 1973-2002/Mar
         (c) 2002 Cambridge Sci Abs
  File 350:Derwent WPIX 1963-2001/UD,UM &UP=200231
         (c) 2002 Thomson Derwent
*File 350: Please see HELP NEWS 350 for details about U.S. provisional
applications. Also more updates in 2002.
  File 347:JAPIO Oct/1976-2001/Dec(Updated 020503)
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16/05/2002 10/023,163

*File 347: JAPIO data problems with year 2000 records are now fixed.
Alerts have been run. See HELP NEWS 347 for details.

Set	Items	Description
S1	1479604	MRI OR MAGNETIC()RESONAN???? OR MRA OR NMR OR MAGNETORESON-ANCE OR PMR OR PROTON()MAGNETIC()RESONAN???? OR MR()IMAG???
S2	8125	CC=A0758
S3	8723	MC=(S01-E02A OR S01-E02A2 OR S03-E07? OR S03-CO2F3 OR S01--E02A8A OR S01-E02A1 OR S03-C02F1)
S4	2747	IC=(G01V-003/175 OR G01N-024/08)
S5	1482539	S1:S4
S6	270	(THREE OR MULTIPLE OR MULTI OR SEVERAL OR ARRAY)(2N)GRADIE-NT? ?(3N)COIL? ?
S7	3323	GRADIENT? ?(3N)COIL? ?
S8	3364	S6:S7
S9	694272	COMPENSAT????
S10	22246	SELF()(INDUC??? OR INCREAS??? OR INITIAT??? OR PRODUC??? OR GENERAT???)
S11	26214	ITSELF(3N)(INDUC??? OR INCREAS??? OR INITIAT??? OR PRODUC?-?? OR GENERAT???)
S12	26147	S11 NOT S10
S13	57540	EDD???(3N)CURRENT? ?
S14	218092	CONDUCT?????(3N)(ELEMENT? ? OR DEVIC?? OR LAYER? ? OR COMP-ONENT? ?)
S15	1571905	SUPPRESS????
S16	963	(THREE OR MULTIPLE OR MULTI)(3N)GRADIENT? ?(3N)FIELD? ?
S17	24360	CC=(A4110D OR A4110F OR B5100 OR B5120)
S18	25320	S16:S17
S19	682	HOMOGEN??????(3N)(STATIC OR STEADY()STATE)(3N)FIELD? ?
S20	871597	HOMOGEN??????
S21	19087	(STATIC OR STEADY()STATE)(3N)MAGNETIC(3N)FIELD? ?
S22	70239	SKIN(3N)EFFECT? ?
S23	25949	(DISK? ? OR RING? ? OR SURROUND??? OR AROUND OR ROUND??? OR DIAMETER??? OR CIRCULAR??? OR CIRCL?????? OR (CIRCULAR??(2N)-BEND OR BENT))AND FERROMAGNET???
S24	28170	CC=(A7550B OR B3110C)
S25	51697	S23:S24
S26	2792	S5 AND S8
S27	187	S26 AND S9
S28	1	S27 AND S11
S29	0	S27 AND S10
S30	77	S27 AND S13
S31	0	S30 AND S10
S32	0	S30 AND SELF()INDUC???
S33	0	S30 AND S14
S34	1	S30 AND S15
S35	4	S30 AND S16
S36	0	S30 AND S17
S37	4	S30 AND S18
S38	0	S37 NOT S35
S39	1	S30 AND S19
S40	6	S30 AND S20
S41	1	S40 AND S21
S42	0	S41 NOT S39
S43	1	S30 AND S25

16/05/2002 10/023,163

28/3,AB/1 (Item 1 from file: 2)
DIALOG(R)File 2:INSPEC

03815606 INSPEC Abstract Number: A91026502
Title: Analytical method for the **compensation** of eddy-current effects induced by pulsed magnetic field gradients in **NMR** systems
Author(s): Jehenson, P.; Westphal, M.; Schuff, N.
Author Affiliation: Service Hospitalier Frederic Joliot, CEA, Orsay, France
Journal: Journal of Magnetic Resonance vol.90, no.2 p.264-78
Publication Date: Nov. 1990 Country of Publication: USA
CODEN: JOMRA4 ISSN: 0022-2364
U.S. Copyright Clearance Center Code: 0022-2364/90/$3.00
Language: English
Abstract: Most **NMR** localization techniques use pulsed magnetic field gradients which, however, induce multiexponentially decaying eddy currents that distort images and spectra. This work describes a comprehensive strategy to measure and to exactly **compensate** for the induced gradient and the shift in B/sub 0/ field which are produced and also to **compensate** for other terms like cross-talk or nonlinear terms. The time dependence of the gradient, and, if desired, of the B/sub 0/ shift and other terms, is measured from FID signals with a method that distinguishes these components. The signals are obtained from a small sample successively at two or more positions by driving the **gradient coil** with a step function current pulse. A multiexponential fit through the measured temporal behavior of the gradient determines the amplitudes and time constants of the various exponential decay terms. A model allows calculation of the exact shape and parameters of the current pulse required to **compensate** for the eddy-current effects. This also turns out to be a multiexponential function, with, however, time constants differing from those of the eddy currents. They would be the same if the shaping did not **itself produce** eddy currents. After **compensation** of the gradient component is achieved, the Delta B/sub 0/(t) component is measured and similarly corrected, as can also be the other terms. The procedure is suited for automation and should avoid long and tedious adjustments by trial and error of the **compensation**, including that with shielded gradients.
Subfile: A

34/3,AB/1 (Item 1 from file: 350)
DIALOG(R)File 350:Derwent WPIX

004485219
WPI Acc No: 1985-312097/198550
XRPX Acc No: N85-231734

Eddy current field **suppression** appts. - **compensates** for fields affecting build up and decay rates of gradient fields in **NMR** imaging systems

Patent Assignee: TECHNICARE CORP (TCAR)
Inventor: FLUGAN D C
Number of Countries: 012 Number of Patents: 004
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 4585995	A	19860429	US 84601897	A	19840419	198620

Priority Applications (No Type Date): US 84601897 A 19840419
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
EP 164199	A	E	25		

Designated States (Regional): AT BE CH DE FR GB IT LI LU NL SE

Abstract (Basic): EP 164199 A

The bore of the magnet is conventionally a cylindrical conductor and this forms the most significant source of **eddy-currents** with a geometric pattern similar to tbat provided by the cylinder shape of the **gradient coils**. The **eddy-currents** detrimentally oppose the changing magnetic fields induced by the **gradient coil** system. **Compensation** circuitry overcomes the effect of these **eddy-currents** by providing **current** overshoot to the **gradient coils** during **gradient** switching.

Instead of slewing the **gradient coil** current producing field (Hc) from zero to the stable level, the current is slewed to a higher than stable level and then exponentially reduced to the stable level.

ADVANTAGE - Change in field produces effective gradient field which is difference between overshoot field and the eddy field.

4/6

Abstract (Equivalent): EP 164199 B

In a nuclear **magnetic resonance** imaging system, including a magnet for devloping a main magnetic field, field gradient apparatus comprising: a **gradient coil** (50) for applying a gradient to said main magnetic field; and means (30-58) coupled to said **gradient coil** (50), for energising said coil (50), including means (30,56) for applying a first current component to produce a desired stabilised field gradient, and means (36,40-44) for applying a second current component substantially during the switching time (t1-t2) of said first current component to **compensate** for the effect of an eddy field in said main magnetic field. (14pp)

Abstract (Equivalent): US 4585995 A

The **compensation** comprises providing current overshoot to the **gradient coil** during **gradient** switching. The current decays with a time constant chosen to substantially offset the decay of eddy fields following gradient switching. A time constant network representative of eddy field decay is coupled in combination with a feedback signal from a current sampling resistor of the **gradient coil**.

Three gradient coils (for x,y and z directions) are provided (Gx,Gy and Gz). A source of gradient signals provides waveforms for the **gradient coils**. The source is usually computer-controlled, since the signals are generally precisely timed pulse waveforms.

ADVANTAGE - Reduces gradient field variation to less than 2%. (11pp

16/05/2002 10/023,163

35/3,AB/1 (Item 1 from file: 35)
DIALOG(R)File 35:Dissertation Abs Online

01557314 AAD9717548
OPTICAL DESIGNS OF **GRADIENT** AND RF **COILS** FOR **MAGNETIC RESONANCE** IMAGING (**MRI**) INSTRUMENT
Author: SHI, FUNAN
Degree: PH.D.
Year: 1997
Corporate Source/Institution: WORCESTER POLYTECHNIC INSTITUTE (0774)
Source: VOLUME 57/12-B OF DISSERTATION ABSTRACTS INTERNATIONAL.
PAGE 7662. 146 PAGES

High resolution **magnetic resonance** images require high performance electromagnetic coils. Due to the stringent requirements and complexity of today's modern **MRI** instrumentation, novel design methods are needed to meet these challenges.

In this dissertation, an optimal design strategy is formulated, which combines the conjugate gradient optimization technique with the finite element method. The validation of this novel approach is confirmed by successfully addressing **three** design examples: a G$\rm\sb{z}$ **gradient** head **coil** with highly linear **gradient field** in the region of interest, a **three**-channel surface **gradient coil** configuration with reduced parasitic **gradient fields** and associated reduced image distortion, and a modified radio frequency (RF) transmit coil with **compensation** for the **eddy current** effects to improve field uniformity.

Based on the results of the developed optimal approach, it is concluded that the combination of the iterative optimal search technique with the finite element method is a powerful **MRI** coil design tool, especially when dealing with complex boundary conditions, inhomogeneous and nonlinear media, transient and **eddy current** problems, and coupled field and multiple coil cases. These are necessary considerations in the development of next generation high-performance **MRI** instruments.

35/3,AB/2 (Item 1 from file: 144)
DIALOG(R)File 144:Pascal

14956904 PASCAL No.: 01-0109398
Design and fabrication of a three-axis edge ROU head and neck **gradient coil**
CHRONIK Blaine A; ALEJSKI Andrew; RUTT Brian K
Department of Physics and Astronomy, University of Western Ontario, London, Ontario, Canada; Imaging Research Laboratories, The John P. Robarts Research Institute, London, Ontario, Canada; Department of Diagnostic Radiology and Nuclear Medicine, University of Western Ontario, London, Ontario, Canada
Journal: Magnetic resonance in medicine, 2000, 44 (6) 955-963
Language: English
The design, fabrication, and testing of a complete **three**-axis **gradient coil** capable of imaging the human neck is described. The analytic method of constrained current minimum inductance (CCMI) was used to position the uniform region of the **gradient coil** adjacent to and extending beyond the physical edge of the **coil**. The average **gradient** efficiency of the **three** balanced axes is 0.37 mT/m/A and the average inductance is 827 mu H. With maximum amplifier current of 200A and receive signal sweep width of +- 125 kHz, the average minimum FOV using this gradient set is 7.9 cm. The completed coil has an inner diameter of 32 cm, an outer diameter of 42 cm, and a length (including cabling connections) of 80 cm. The entire coil was built in-house. The structure is actively water cooled. Heating measurements were made to characterize the thermal response of the coil under various operating conditions and it was determined that a continuous current of 100A could be passed through all three axes simultaneously without increasing the internal coil temperature by more than 23 Degree C. **Eddy current** measurements were made for all axes. With digital **compensation**, the gradient **eddy current** components could be adequately **compensated**. A large B SUB o **eddy current** field is produced by the Gz axis that could be corrected through the use of an auxiliary B SUB o **compensation** coil. Preliminary imaging results are shown in both phantoms and human subjects.

16/05/2002 10/023,163

35/3,AB/3 (Item 1 from file: 350)
DIALOG(R)File 350:Derwent WPIX

011562766
WPI Acc No: 1997-539247/199750
XRPX Acc No: N97-448809
Magnet arrangement for one-sided **NMR** tomography system rotationally symmetric about z-axis - has outer permanent magnetic ring and further inner rotationally-symmetric recessed field generator elements which generate most of the homogeneous magnetic field in measuring volume
Patent Assignee: BRUKER ANALYTIK GMBH (BRUK-N)
Inventor: KNUETTEL B; WESTPHAL M; HARTMANN W; SIMON A
Number of Countries: 003 Number of Patents: 005
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 5959454	A	19990928	US 97856759	A	19970515	199947

Priority Applications (No Type Date): DE 1020926 A 19960524
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 5959454	A			G01V-003/00	

Abstract (Basic): GB 2313444 A

The magnet arrangement includes a permanent magnetic ring (4) with an outer radius (Ra) and an inner radius (Rj) which is magnetised axially along the z-axis and extends in the axial direction up to a plane E (5), for the generation of a homogeneous magnetic field in a measuring volume (2). At least one further permanent magnetic field-generating element (6), which is rotationally symmetric, is arranged in a radial region R < Rj with respect to the plane on the same side as the permanently magnetic ring and at an axial distance from the plane such that a depression (V) is formed on the surface of the magnet arrangement facing the plane.

The permanent magnetic field-generating elements generate at least 90%, preferably 99%, of the homogeneous field in the measuring volume. The shape of the recess is cylindrical with the cylinder axis z, a planar bottom (6) and a cylindrical outer delimitation (7) having a radius (Rj) and an axial length (T). The rear (8) of the magnet arrangement is provided with removable supporting plates (9) on which inhomogeneity-**compensator** elements (10) are disposed.

USE/ADVANTAGE - Especially for examination of skin or other region near surface. **Gradient coils** generate **three** orthogonal **field gradients** of sufficient linearity and strength, while not generating stray field in main field magnet area to reduce **eddy currents**, and while not obstructing access to measuring volume for patient or skin area to be examined.

16/05/2002 10/023,163

35/3,AB/4 (Item 1 from file: 347)
DIALOG(R)File 347:JAPIO

04901968
SYSTEM FOR **MAGNETIC RESONANCE** IMAGING

PUB. NO.: 07-194568 [JP 7194568 A]
PUBLISHED: August 01, 1995 (19950801)
INVENTOR(s): KONDO MASASHI
APPLICANT(s): TOSHIBA CORP [000307] (A Japanese Company or Corporation), JP (Japan)
APPL. NO.: 05-354465 [JP 93354465]
FILED: December 29, 1993 (19931229)

ABSTRACT

PURPOSE: To effectively restrain an **eddy current** magnetic field. and obtain large magnetic field gradient intensity by combining an incomplete shielding type ASGC having a structure that a relative ratio of the ampere turn number of shielding coils and main coils is reduced and **eddy current** time response **compensation** with each other.

CONSTITUTION: A magnetostatic field magnet 1 is driven by exciting electric power supply 2, and a main **gradient coil** group 3 and a shielding coil group 14 are driven by electric power supply 4 for a **gradient coil**, respectively, and a **gradient** magnetic **field** having a linear magnetic **field gradient** is impressed in **three** directions mutually orthogonal to a magnetostatic field of a specimen 5. A **magnetic resonance** signal generated from the specimen 5 is detected, and is converted into an image. In such a **magnetic resonance** imaging device, a **gradient** magnetic field **coil** to reduce a leakage of magnetic field is provided. This is formed in a structure that a relative ratio of the product of the turn number of shielding coils and a value of an electric current flowing to them to the product of the turn number of main coils, and a value of an electric current flowing to them is reduced. An **eddy current compensating** circuit 18 is arranged to **compensate** time response of an **eddy current** when the relative ratio is reduce

39/3,AB/1 (Item 1 from file: 350)
DIALOG(R)File 350:Derwent WPIX

007835439
WPI Acc No: 1989-100551/198914
XRPX Acc No: N89-076677
Producing spin echo pulse sequences in nuclear spin tomograph - using current pulse to alter static magnetic or varying interval between first 90 deg HF pulse and next 180 deg HF pulse
Patent Assignee: BRUKER MEDIZINTECH GMBH (BRUK-N)
Inventor: RATZEL D; SHUFF N; SCHUFF N
Number of Countries: 005 Number of Patents: 006
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 4896112	A	19900123	US 88241440	A	19880907	199011

Priority Applications (No Type Date): DE 3730148 A 19870909
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 4896112	A		16		

Abstract (Basic): DE 3730148 A
A current pulse is applied to a static magnetic field **compensating** coil at least on the interval between a first 90 deq. h.f. pulse and the following 180 deq. h.f. pulse or only between the 180 deg. h.f. pulses. The current pulse produces a transient variation of the static magnetic field. The result is that the dephasing effect on the nuclear spin of the chanqe in the static magnetic field caused by application of one or more gradient fields is more or less **compensated**.

The interval between the first 90 deg. pulse and the following 180 deg. pulse may be set to a value differing from half the interval between the following 180 deg. pulses to **compensate** the dephasing effect. Pref. the size of the current pulse or the interval between the first 90 deq. pulse and the following 180 deg. pulse is proportional to the gradient field.

ADVANTAGE - Simple **compensation** of field distortion caused by **eddy currents** etc.

Abstract (Equivalent): EP 309720 B
Method for generating spin echo pulse sequences in a nuclear spin tomograph, comprising a magnet (1) for generating a **homogeneous static** magnetic **field**, at least one auxiliary coil (2) to which a **compensation** current is applied, for correction of the **static** magnetic **field** by means of a spatially **homogeneous** correction field, at least one **gradient coil** (3) for generating a gradient field varying in space and directed in the same direction as the static magnetic field, which **gradient coil** can be subjected to currents varying over time, and at least one rf coil arrangement (7, 8) to which rf pulses can be supplied for exciting nuclear spins of a body located in the

homogeneous static magnetic **field** and permitting the resonance signals generated by the excited nuclear spins to be received, in which method the excitation of the nuclear spins is accomplished by means of a sequence of rf pulses comprising a first excitation pulse and a subsequent sequence of rf pulses serving for generating spin echoes, current pulses are applied to the at least one **gradient coil** int he intervals between successive rf pulses, and furthermore the influence of the **eddy currents** and other inaccuracies produced by the generation of the gradient fields is **compensated,** characterised in that a current pulse (74) is applied to the auxiliary coil (2), at least in the time interval between the excitation pulse (31) and the next following rf pulse (32) or only between each of the rf pulses which current pulse effects a spatial **homogeneous** variation of the **static** magnetic **field** limited in time so as to balance out, at least approximately, the dephasing effect on the excited nuclear spins resulting from the variation to which the static magnetic field is subjected by the insertion of the at least one gradient field (64).

16/05/2002 10/023,163

40/3,AB/1 (Item 1 from file: 6)
DIALOG(R)File 6:NTIS

1881149 NTIS Accession Number: DE95007907
Velocity and concentration studies of flowing suspensions by nuclear **magnetic resonance** imaging. Technical progress report, October 1--December 31, 1994
Lovelace Institutes, Albuquerque, NM.
Corp. Source Codes: 108527000; 9532303
Sponsor: Department of Energy, Washington, DC.
Report No.: DOE/PC/94248-T1
17 Jan 95 4p
Languages: English
Journal Announcement: GRAI9516; ERA9532
Sponsored by Department of Energy, Washington, DC.
Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
NTIS Prices: PC A01/MF A01

Despite its many advantages, the usual **MRI** is relatively slow, with most applications limited to stationary objects or to objects undergoing periodic motion imaged synchronously with the motion. Attempts to speed up imaging have to confront the **eddy currents** induced in conducting surfaces by the pulsed magnetic fields associated with the gradients. Such **eddy currents** recover slowly and adversely affect imaging speed and image quality. A strategy in combating **eddy current** problems is to alter the shape of the driving waveforms going to the **gradient coils** so that the resulting ''distorted'' waveform is the desired one. For **eddy currents**, the common **compensation** scheme consists of adding suitable amounts of RC filtered signal to the input, with the RC time constants matched to each **eddy current** decay times. Unfortunately, the situation is much more complex in the real world because of the non-ideal geometries involved. Specifically, the conducting surfaces on which **eddy currents** are generated are neither **homogeneous**, symmetric, nor have the same conductivity and time-constants. As a consequence, the induced **eddy currents** are numerous and do not have the same symmetry as the original inducing field or even as each other. Thus, **compensating** the input waveform of a particular gradient component, even for all the time-constants, can only correct the induced gradient corresponding to that component. The other components of induced gradients must be corrected by separate hardware that are specific to those components as explained here.

16/05/2002 10/023,163

40/3,AB/2 (Item 1 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

01464512 Genuine Article#: HA824 Number of References: 0
(NO REFS KEYED)
Title: INSTRUMENTATION FOR **MAGNETIC-RESONANCE** ANGIOGRAPHY (
Abstract Available)
Author(s): SALONER D; ANDERSON CM
Corporate Source: VET ADM MED CTR,DEPT RADIOL,RADIOL SERV 114,4150 CLEMENT
ST/SAN FRANCISCO//CA/94121
Journal: CARDIOVASCULAR AND INTERVENTIONAL RADIOLOGY, 1992, V15, N1 (
JAN-FEB), P14-22
Language: ENGLISH Document Type: ARTICLE
Abstract: **Magnetic resonance** angiography (**MRA**) places high demands on instrumentation capabilities. Magnetic gradient strength capabilities, main magnetic field strength and **homogeneity**, and **eddy current compensation** all play a role in determining the quality of the flow studies. In addition, radiofrequency coil design and use is governed by the specific vascular territories of interest. Once the instrumentational and pulse sequence considerations have been optimized, the postprocessing and display of the acquired three-dimensional data sets is of key importance. Great strides have been made in addressing instrumentation needs for **MRA**, but further improvements are anticipated.

16/05/2002 10/023,163

40/3,AB/3 (Item 1 from file: 350)
DIALOG(R)File 350:Derwent WPIX

011562766
WPI Acc No: 1997-539247/199750
XRPX Acc No: N97-448809

Magnet arrangement for one-sided **NMR** tomography system rotationally symmetric about z-axis - has outer permanent magnetic ring and further inner rotationally-symmetric recessed field generator elements which generate most of the **homogeneous** magnetic field in measuring volume

Patent Assignee: BRUKER ANALYTIK GMBH (BRUK-N)
Inventor: KNUETTEL B; WESTPHAL M; HARTMANN W; SIMON A
Number of Countries: 003 Number of Patents: 005
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 5959454	A	19990928	US 97856759	A	19970515	199947

Priority Applications (No Type Date): DE 1020926 A 19960524
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 5959454	A			G01V-003/00	

Abstract (Basic): GB 2313444 A

The magnet arrangement includes a permanent magnetic ring (4) with an outer radius (Ra) and an inner radius (Rj) which is magnetised axially along the z-axis and extends in the axial direction up to a plane E (5), for the generation of a **homogeneous** magnetic field in a measuring volume (2). At least one further permanent magnetic field-generating element (6), which is rotationally symmetric, is arranged in a radial region R < Rj with respect to the plane on the same side as the permanently magnetic ring and at an axial distance from the plane such that a depression (V) is formed on the surface of the magnet arrangement facing the plane.

The permanent magnetic field-generating elements generate at least 90%, preferably 99%, of the **homogeneous** field in the measuring volume. The shape of the recess is cylindrical with the cylinder axis z, a planar bottom (6) and a cylindrical outer delimitation (7) having a radius (Rj) and an axial length (T). The rear (8) of the magnet arrangement is provided with removable supporting plates (9) on which inhomogeneity-**compensator** elements (10) are disposed.

USE/ADVANTAGE - Especially for examination of skin or other region near surface. **Gradient coils** generate **three** orthogonal field **gradients** of sufficient linearity and strength, while not generating stray field in main field magnet area to reduce **eddy currents**, and while not obstructing access to measuring volume for patient or skin area to be examined.

40/3,AB/4 (Item 2 from file: 350)
DIALOG(R)File 350:Derwent WPIX

009729628
WPI Acc No: 1994-009478/199402
XRPX Acc No: N94-007637
Magnetic resonance imaging - applying preparatory sequence comprising excitation RF pulse, refocussing pulses and switched gradient magnetic fields
Patent Assignee: KONINK PHILIPS ELECTRONICS NV (PHIG); PHILIPS ELECTRONICS NV (PHIG); US PHILIPS CORP (PHIG)
Inventor: VAN DER MEULEN P; VAN YPEREN G H
Number of Countries: 005 Number of Patents: 004
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 5450010	A	19950912	US 9384833	A	19930629	199542
			EP 93201805	A	19930622	

Priority Applications (No Type Date): EP 92201926 A 19920629
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 5450010	A		11	G01R-033/48	

Abstract (Basic): EP 577188 A
The appts. comprises a set of main magnetic coils which generate a stationary **homogeneous** main magnetic field and **several** sets of **gradient coils** which superimpose additional magnetic fields which have controllable strength and a gradient in a selected direction. RF pulses from an emitter pass through a modulator to the object.

The **NMR** signals are received, with a send/receive switch separating the received signals from the emitted pulses. A control system steers the emitter and the power supply to the **gradient coils** to generate a predetermined sequence of RF and gradient field pulses.

ADVANTAGE - Reduces effects of **eddy currents** and other disturbances such as phase distortion in RF pulses without providing additional coils, allowing spatial variations to be taken into account.

Dwg.3/4

Abstract (Equivalent): US 5450010 A
In an **MRI** device (1) operating according to a spin-echo method, switched gradient magnetic fields are applied in the form of slice selection (231-233), phase encoding (243-243, 243'243') and read gradients (252-253). The switching of the gradients causes **eddy currents** in metal parts of the apparatus. The **eddy currents** disturb the applied magnetic fields, thereby changing the phases of the precessing nuclear spins of a body (7) to be examined and causing artifacts in a reconstructed image. Another source of disturbance may be phase-distortion in the RF amplifier.

By modifying a gradient (251, 231') in between the excitation pulse (221) and the first refocusing pulse to (222) in the spin-echo sequence and/or a change in phase of the RF-pulses, the effects of the

disturbances can largely be **compensated** for. The additional gradient size is adjusted by measuring the position in time and the relative phase of spin-echo signals (162, 163) in a preparatory sequence (121-173).

16/05/2002 10/023,163

40/3,AB/6 (Item 4 from file: 350)
DIALOG(R)File 350:Derwent WPIX

007088100
WPI Acc No: 1987-088097/198713
XRPX Acc No: N87-066103
NMR imaging appts. with increased spatial magnetic field **homogeneity** - uses additional pairs of rings of soft-magnetic material to **compensate** for higher than fourth order errors
Patent Assignee: PHILIPS GLOEILAMPENFAB NV (PHIG)
Inventor: VANDERVLUG F F; VREUGDENHI E
Number of Countries: 010 Number of Patents: 008
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 4771243	A	19880913	US 86891849	A	19860801	198839

Priority Applications (No Type Date): NL 852340 A 19850826
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 4771243	A		6		

Abstract (Basic): EP 216404 A

The **gradient coil** holder (32) of the **NMR** imaging appts. includes rings (34) of ferromagnetic material disposed in recesses in the coil holder. To reduce **eddy currents**, each ring is divided into a set of separate segments spaced by projections of the coil holder material.

To facilitate adjustment for optimum correction, the ring segments are formed of a stack of wires which can be added or removed separately.

USE/ADVANTAGE - Particularly for medical diagnosis. Provides increased **homogeneity** while permitting the use of a shorter coil.

2b/2b

Abstract (Equivalent): EP 216404 B

A **magnetic resonance** imaging apparatus which includes a coil system for generating a steady magnetic field in a measurement space situated within the magnet system provided with magnetic material for increasing spatial magnetic field **homogeneity**, characterised in that the magnetic material is provided in the magnet system in the form of coaxial, ring-shaped element, being sub-divided into a plurality of sector arcs by azimuthal interruptions in order to increase the field **homogeneity** of the steady magnetic field also for higher order terms of a polynomial describing the steady field.

16/05/2002 10/023,163

43/3,AB/1 (Item 1 from file: 350)
DIALOG(R)File 350:Derwent WPIX

007088100
WPI Acc No: 1987-088097/198713
XRPX Acc No: N87-066103
NMR imaging appts. with increased spatial magnetic field homogeneity - uses additional pairs of **rings** of soft-magnetic material to **compensate** for higher than fourth order errors
Patent Assignee: PHILIPS GLOEILAMPENFAB NV (PHIG)
Inventor: VANDERVLUG F F; VREUGDENHI E
Number of Countries: 010 Number of Patents: 008
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 4771243	A	19880913	US 86891849	A	19860801	198839
EP 216404	B	19900321				199012

Priority Applications (No Type Date): NL 852340 A 19850826
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 4771243	A		6		

Abstract (Basic): EP 216404 A

The **gradient coil** holder (32) of the **NMR** imaging appts. includes **rings** (34) of **ferromagnetic** material disposed in recesses in the coil holder. To reduce **eddy currents**, each **ring** is divided into a set of separate segments spaced by projections of the coil holder material.

To facilitate adjustment for optimum correction, the **ring** segments are formed of a stack of wires which can be added or removed separately.

USE/ADVANTAGE - Particularly for medical diagnosis. Provides increased homogeneity while permitting the use of a shorter coil.